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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :

ATSUSHI SHIOTA ET AL. : GROUP ART UNIT: 1712

SERIAL NO: 09/770,289 :

FILED: JANUARY 29, 2001 : EXAMINER: FEELY, M.

FOR: PROCESS FOR PRODUCING SILICA-BASED FILM, SILICA-BASED FILM, INSULATING FILM, AND SEMICONDUCTOR DEVICE

DECLARATION UNDER 37 C.F.R. § 1.132

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

I, Atsushi SHIOTA, a citizen of Japan,

hereby declare and state that:

1. I have a degree in Chemistry, which was conferred upon me in 19 86 by Sophia University located in Tokyo, Japan.

2. I have been employed by JSR CORPORATION since 19 89 and I have a total of 13 years of work and research experience in the field of electronic materials.

3. The following experiments were carried out by me or under my direct control.

4. A silicone compound falling within the scope of the invention was applied to a number of identical substrates. The coated substrates were then heated at 80°C for 90 seconds, and further heated at 200°C for 180 seconds. The entire coated surface of each of the heated substrates was irradiated using a 5.5 keV, 3 mA electron beam at a substrate temperature of 350°C and in a 0.01 torr Ar atmosphere using various electron doses. The following TABLE A shows the variation with electron dose of the silicone compound dielectric constant (k) and film strength (E).

TABLE A

DOSE ($\mu C/cm^2$)	k	E (Gpa)
0	2.11	2.62
50	2.12	3.98
75	2.11	4.92
100	2.17	5.09
150	2.31	6.30
300	2.98	7.75

5. TABLE A shows that the dielectric constant of the electron beam irradiated silicone compound increased significantly at electron beam doses between 150 $\mu C/cm^2$ and 300 $\mu C/cm^2$.

6. TABLE A also shows that the dielectric constant of the electron beam irradiated silicone compound remained in a range of from about 2.1 to 2.5 for electron beam doses in a range of from 1 to 200 $\mu C/cm^2$, but increased rapidly outside of this range reaching a dielectric constant of around 3 at a dose of 300 $\mu C/cm^2$.

7. Because the dielectric constant of the electron beam irradiated silicone compound at a electron beam dose of 50 $\mu C/cm^2$ was only 71% (= (100)(2.12/2.98)) that obtained when the electron beam dose was 300 $\mu C/cm^2$, in my opinion electron beam doses in the range of from 1 to 200 $\mu C/cm^2$ provide a significant reduction in dielectric constant in electron beam irradiated siloxane compounds relative to doses above this range.

8. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Date: April 11, 2003

Atsushi SHIOTA

Atsushi SHIOTA

Declarant's Name (typed)